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of pith follows incidentally, and in the following manner; in the absence of special organs, as nerves, to conduct the stimulus of an irritant, in vegetables irritation can only be conveyed from cell to cell, and hence the further a cell is located from the origin of the irritation the less its effect will be felt. Now irritation within natural limits can only serve to increase cell activity and growth. This is just what Darwin found in the cases which I have quoted; and it is just what I should expect to find in the plant under consideration.

In the same manner it would seem reasonable to account for the great difference in size existing between the supported and the unsupported plant. This difference has long been noted, and doubtless Linnæus and others following him founded their different species *mainly* upon that character. In the one instance the plant has, so to speak, every energy brought into full activity, while in the other, one great incitement to full activity is witheld. The former attains its full stature, the latter remains a dwarf.

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§ 127. **Fresh Water Algae.**—Collected during the past three years, mostly within a circuit of about twenty miles around Bethlehem, Penn., by Francis Wolle.

[Thirty species believed to be new to the United States and ten entirely new discoveries are indicated by Italics.]

DESMIDIEÆ.

1. **Palmoglœa**, Ktz.—*P. clamydospera*, de By.
2. **Penium**, Breb.—P. digitis, Breb.—P. Closteroides, Ralfs.—P. interruptum, Breb.—P. *oblongum*, de By.
3. **Closterium**, Nitzsch.—*C. obtusum*, Breb.—C. angustatum, Ktz. —C. striolatum, Ehrb.—C. lunula, Ehrb.—C. Ehrenbergii, Menegh.—C. Leibleinii, Ktz.—C. Dianae, Ehrb.—C. Venus, Ktz. —C. parvulum, Naeg.—C. Jenneri, Ralfs.—C. rostratum, Ehrb. —C. setaceum, Ehrb.—C. moniliferum, Bory.—C. lineatum, Ehrb.—C. acerosum, Ehrb.—C. *turgidum*, Ehrb.
4. **Tetmemorus**, Ralfs.—T. Brebissonii, Menegh.—T. lævis, Ktz.
5. **Pleurotaenium**, Naeg.—P. Trabecula, Naeg.—P. clavatum, Ktz. —P. crenulatum, Ehrb.—P. hirsutum, Bailey.—P. nodosum, Bailey.
6. **Spirotaenia**, Breb.—S. condensata, Breb.
7. **Sphaerozosma**, Corda.—S. excavatum, Ralfs.
8. **Hyalotheca**, Ehrb.—H. dissiliens, Breb.—H. mucosa, Ehrb.
9. **Bambusina**, Ktz.—B. Brebissonii, Ktz.
10. **Didymoprium**, Ktz.—D. Grevillii, Ktz.
11. **Desmidium**, Ag.—D. Swartzii, Ag.—D. Swartzii, *var.* Ralfsii.—D. aptogonum, Breb.
12. **Aptogonum**, Ralfs.—A. Baileyi, Ralfs, finely in fruit.
13. **Cosmarium**, Corda.—C. margaritiferum, Menegh.—C. Botrytis, Menegh.—C. ovale, Ralfs.—C. tetrophthalmum, Ktz.—C. *conspersum*, Ralfs.—*C. Portianum*, Archer.—*C. Ralfsii*, Breb.—*C. lœve*, Rab.—C. Cucumis, Corda.—C. pyramidatum, Breb.—

C. quadratum, *var. minus.* Grun.—C. binoculatum, Breb.—C. Meneghinii, Breb.—*C. subcrenatum*, Naeg.—C. crenatum, Ralfs.—*C. retusum*, Perty.—C. ornatum, Ralfs.—C. cælatum, Ralfs.—C. Broomei, Thwaites.—*C. protractum*, Naeg.—*C. orbicalatum*, Ralfs.—C. Thwaitesii, Ralfs.—C. connatum, Breb.—C. connatum, *var. minus*, new var., differs from the typical form mainly in size, being only half as large.

C. dentatum, n. sp.—Frond one-half longer than wide, semicells oval or suborbicular, constriction deep. Cytioderm finely and rather closely set with short conical pearly granules; the margins of the sides of the segments dentate with more distant and larger conical projections, ten to twelve on each side. The ends rounded and devoid of projecting teeth. End view oval. Side view elliptical, with a deep constriction in the middle. Length of frond .0058″—0063.″ Width .0036″—004.″

C. pectinoides, n. sp.—Frond suborbicular, somewhat longer than broad, constriction linear. Segments semiorbicular, undulate on the margins with twenty or more crenulations, roughened with geminate rows of pearly granules symetrically arranged in radiating lines. On green fronds the united twinned granules appear oblong and the crenulations somewhat dentate. Each segment furnished at base with a rounded protuberance most distinctly evidenced by side view. The resemblance to forms of many seaside shells suggested the name. Frond .0025″ long, and .0018″ broad.

14. **Euastrum**, Ehrb.—E. verrucosum, Ehrb.—*E. pectinatum*, Breb.—E. oblongum, Ralfs.—E. ampullaceum, Ralfs.—E. didelta, Ralfs.—E. elegans, Ktz.—E. binale, Ralfs.—E. ornatum, Wood.—E. circulare, Hassel.—*E. rostratum*, Ralfs.
15. **Micrasterias**, Ag.—M. oscitans, *var.* pinnatifida, Ktz. *var. inflata*, new.—M. Americana, *var. recta*, new.—M. Crux-Melitensis, Ralfs.—M. truncata, Breb.—M. furcata, Ag.—M. Jenneri, Ralfs.—M. foliacea, Bailey.—*M. multifida*, n. sp.—M. denticulata, Breb.—M. disputata, Wood.—M. muricata, Ralfs.

Three forms are considered new. M. oscitans, var. *inflata* differs from the typical forms in having the lateral lobes not "narrow and conical" but broad, with sides nearly parallel and often inflated or widened at the ends. M. Americana, var. *recta* differs from the normal form in having the terminal lobe, not "concave and bipartite at the angles," but straight and entire, with two conical tubercles on the margin towards the lateral ends.

M. multifida, n. sp. Frond punctate, five lobed: basal lobe bifid, and middle lobe trifid, and each section again bifid, and by a shorter sinus bifurcate at apices; or, segments may be called eleven lobed; the lateral lobes deeply bisected, sinus more or less rounded at base, sections forked. Terminal lobe narrow, not exerted, sinus wide, angles bifurcate. Rarely with nine lobes. .005″ wide. 005″—006″ long.

16. **Staurastrum**, Meyen.—St. muticum, Breb.—St. orbiculare, Ralfs.—*St. brevispina*, Breb.—*St. Dickiei*, Ralfs.—St. dejectum, Breb.—*St. Avicula*, Breb.—*St. brachiatum*, Ralfs.—*St. bifidum*, Breb.—St. Margaritaceum, Menegh.—St. dilatatum,

Ehrb.—*var.* alternans, Breb.—St. punctulatum, Breb.—St. polymorphum, Breb. — St. cyrtoceron, Breb. — St. paradoxum, Meyen.—St. gracile, Ralfs.—St. hirsutum, Breb.—*St. teliferum*, Ralfs.—*St. Saxonicum*, Bulnh.—St. polytrichum, Perty.—*St. spongiosum*, Breb.—*St. controversum*, Breb.—*St. vestitum*, Ralfs.—*St. oxacanthum*, Archer.—St. furcigerum, Breb.—*St. lunatum*, Ralfs.—St. munitum, Wood. The following four are considered new species.

St. bibrachiatum, n. sp., segments subquadrangular, or cuneate, gradually widening upward, truncate at ends, lateral extremities each tapering into a single, elongate divergent colorless process, rough or denticulate on the margins. Arms two to three times as long as the body. End view elliptical, with a single process at each end, tips obtuse dentate.—.00187″—.00225″ long with arms. .0015″—.0016″ wide.

St. cuneatum, n. sp. Frond as long as wide. Segments broadly cuneate with convex bases, producing in front view deep constrictions between them. Sides converging from the base upward to a truncate end, each with three to six sharp teeth, spaces between them deep inverted crenulations. End view triangular, sides somewhat concave, angles bi-trifid, with six radiating central processes rarely extending beyond the sides. .00175″—00225″ each way.

St. binaculeatum, n. sp. Frond smooth, front view subelliptical, inner margins more convex than the outer, angles with two spines separated at the base. End view triangular, sides slighty concave, angles bluntly rounded with two rather long more or less divergent spines on each. .0015″ long, .002″ wide.

St. cruciatum, n. sp. Frond small, smooth, front view cruciform, the arms mammillare, sinus wide, obtuse angled. End view three or four lobed, each slightly tapering, ends rounded with a number of more or less diverging setae, as long as the lobes, on the ends of each. .001″ without setae.

17. **Xanthidium**, Ehrb.—X. fasciculatum, Ehrb.—ditto *var. antelopæum*, Ktz.—ditto *var. polygonum*, Ehrb.

18. **Arthrodesmus**, A. convergens, Ehrb.

I shall be pleased to hear from any one interested in this subject, especially with a view to add to the knowledge of this kind of plants.

F. W.

§ 128. **A Two Day's Excursion.**—The geology of Grayson County, Ky., at the station called Big Clifty, is peculiarly adapted to the growth of ferns. The sand stone which underlies the surface is quite soft and disintegrates readily. The country is very hilly, and the streams, which at times rise rapidly, have worn their beds into immense gullies. Big Clifty Creek bridge, 62 miles from Louisville, on the Paducah R. R., from cliff to cliff, is one hundred and thirty two feet high. The following is a list of ferns collected in a recent excursion by Major W. J. Davis and myself, within a circle of a radius not greater than two and one half miles. Aspidium acrostichoides, Swartz; A. spinulosum, Swartz; A. spin, var. intermedium; A. Noveboracense, Swartz; A. marginale; Swartz; Adiantum pedatum, L.; Botrychium Virginicum, Swartz; Camp-